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SELECTED TRANSLATIONS ON IMMUNOLOGY FROM "PEDIATRIYA" (PEDIATRICS)

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SELECTED TRANSLATIONS ON IMMUNOLOGY FROM "PEDIATRIYA" (PEDIATRICS)

[Following are the translations of two articles on immunology from Pediatriya, Vol 40, No 2, Moscow, February 1961, pages 32-37 and 37-42 respectively.]

TABLE OF CONTENTS

THE LEVEL OF PROPERDIN AND GENERAL IMMUNOLOGICAL REACTIVITY OF CHILDREN AFFLICTED WITH RHEUMATISM.

-USSR-

[Following is the translation of an article by P. L. Shteynlukht, in Pediatriya (Pediatrics), Vol 40, No 2, Moscow, February 1961, pages 32-37.]

The organism's over-all resistance to harmful agents, especially to infectious ones, is a very important factor in the inception, course, and outcome of a disease.

Two indices proposed for the comparative study of the organism's general resistance to infection have recently attracted attention; they are the level of properdin in the blood, and the organism's level of general immunological reactivity.

It is to the properdin system (from the Latin, perdere -- to destroy) that the bactericidal properties of human and animal blood are attributed. Data obtained by Pillemer and others who discovered and isolated this system in 1954 have led to the mention of euglobulin, composing 0.03% of the serum albumin. Properdin effect is apparent only in the presence of all four complementary components and magnesium ions. The work of many investigators (Pillemer, Wardlaw, Wedgewood, E. Z. Rukhadze, Ginsberg, E. N. Voluyskaya, N. V. Cheburkhina, V. I. Tovarnitskiy, Gronroos, and others) has demonstrated the fundamental bactericidal effect of the properdin system on gram-negative microbes, its neutralizing effect on viruses, and the destruction of certain protozoa (e.g., toxoplasm).

Pillemer and other authors (Ross) reported a sharp decrease of properdin level in the blood of animals subjected to general irradiation, and that a large part of irradiated animals were saved from death by the introduction of properdin preparation.

According to the available clinical observations, the properdin titer is sharply decreased in children during the first postnatal months, and reaches adult level only in their second year (Koch, Schultze, Schwick). Other data (those of Fumarol) indicate that the average properdin blood level in children over three to four months of age differs little from the adult level. However, the practical absence of properdin in 26% to 32% of healthy children was noted. The low resistance of newly born infants to infection (especially dermal) is related to the low blood level of properdin (deLuca, Caruso).

We noted (1959) a significant decrease of properdin titer in children under one year of age, who were afflicted with pneumonia; this decrease was particularly evident in infants up to three

months of age. In children of the same age group afflicted with acute digestive disturbances (dyspepsia, colienteritis), the properdin level in the blood was lower still than with pneumonia.

V. I. Ioffe and others have done a considerable amount of research on the study of the organism's general immunological reactivity.

General immunological reactivity implies "the organism's capacity for immunological reaction (and immunological reconstruction) when adequately stimulated by antigen" (V. I. Ioffe).

From this definition, it follows that general immunological activity can, to a certain degree, characterize the organism's resistance to infection. V. I. Ioffe proposed a simple subcutaneous test for determining general immunological reactivity; this test is based on the principle of local reverse anaphylactic reaction. The patient receives a subcutaneous injection of serum from a rabbit which had been immunized with an emulsion of human tissue. This results in a reciprocal reaction between the patient's tissue antigen, and the antigen of the rabbit serum. This can induce a local reaction of varying intensities, depending on the immunological reactivity of the patient. The level of general immunological reactivity is measured by the reaction and by its intensity.

Our problem was to obtain comparative data regarding these indices in children afflicted with rheumatism. Blood properdin level was determined by the hemolytic method of Pillemer, modified by Rosenthal and Savelwolf (1958). This method is based on properdin's ability to inactivate the third fraction of the complement under certain experimental conditions. The general immunological reactivity was determined by V. I. Ioffe's subcutaneous test.

We observed 85 children (60 girls and 25 boys) suffering from rheumatism. There were 14 children from four to seven years old, 27 children between eight and eleven years, and 44 children between the ages of twelve to fourteen.

Fifty-seven of the patients were experiencing their first bout with rheumatism; twenty-seven, a recurrent attack. In one girl the rheumatism was latent and was diagnosed because of a heart defect which had formed. Heart defects were noted in all of the children; in 43, it was myocarditis; in 34, endomyocarditis; and in five, pancarditis. In three patients we were unable to determine whether the defect was myocardial or endomyocardial, and diagnosed it as rheumocarditis. Afflictions of the joints were noted in 38 children, chorea in twelve, and chorea symptoms and polyarthritis in three children. In seven patients we observed a skin affliction, a ring-like rash.

We used the accepted classification of rheumatism and noted the type of disease course according to pathogenic principles proposed by E. A. Gornitskaya. We also noted the apparent condition of the organism's reactivity.

The children were grouped in the following manner, according to the type of rheumatic course: 1) those with a productive type of disease course, 48 patient; 2) those with an exudative course, 32 patient;s 3) those with a constantly relapsing course, 5 patients. More than half of the children had chronic tonsillitis(45 out of 85). In all, 374 observations on the blood properdin level were made. Blood for analysis was taken from the children on an average of once every ten days.

As a point of comparision, 75 healthy children between the ages of one and fourteen years were examined (39 boys and 36 girls). The average properdin titer in healthy children was equal to 58.76 units/milliliter. No properdin was found in three children. There was no special difference noted in the properdin ratio in relation to age or sex.

In analyzing the properdin ratio in children afflicted with the exudative type of rheumatism course, low properdin titers were found in only three out of twelve examined children (i. e., the properdin ratio was somewhat higher than in healthy children). Beginning with the twentieth day of disease, its quantity decreased; low titers were observed in eight out of 18 children; in the third decade [thirtieth to fortieth days], low titers were observed in 12 out of 28 children; in the fourth decade, 20 out of 26; in the fifth decade, 17 out of 24; and in the sixth (51-60 days of illness), in 14 out of 26 children. Consequently, toward the end of the second month after the onset of disease, low levels of properdin occur in a significantly higher number of children than at the beginning of the illness.

In children with a productive type of rheumatic course, a normal level of properdin with insignificant fluctuations was observed during the first one and a half months of the disease. Thus, low titers occurred during the first decade (10 days) in five out of 15 subject;s during the second decade, 11 out of 29; in the third decade, 18 out of 41; in the fourth, 13 out of 35 children. Not until the fifth decade (41-50 days of illness) was there an increase in the number of children (18 out of 30) with low properdin titer.

In five children the course of rheumatic attack was the severe, or the continually relapsing type. In three of these, the properdin blood level was significantly increased (80 to 100 units/ml). Finally, in the fifth patient a low properdin level was observed at the start; this level increased with each successive intensification of the disease process. Aside from this, simultaneous observation of two children with severe courses of rheumatic attacks (which proved lethal) showed an increase of blood properdin level (80 units/ml) six days before death in one, and 24 hours before death in the other child.

It was possible to observe the influence of intercurrent infections on the properdin titer. Additional diseases (anginas, catarrh of the upper respiratory tract, bronchitis, laryngitis,

otitis) induced, in six out of thirteen patients, a properdin level which increased by 10, 20, or 25 units and remained at this level for 10 to 20 days. In five children the disease process became intensified. In these cases the properdin level increased by 20 to 30 units/ml, and was sustained at this level for 20 to 30 days. Chronic tonsillitis did not affect the properdin level.

The general immunological reactivity was observed in 83 patients; of these, 34 were re-examined. Of 83 patients, only eight had intnese reactions, and 28 had positive reactions . In the remaining 47 children, the reaction was either negative or doubtful.

It must be noted that according to the data of our clinic (N. B. Grinbaum), 98% of healthy children show a positive reaction on the immunological reactivity, and in 37% the reactions are intense.

No special characteristic of reaction was found in the productive and the exudative types of the rheumatic process. One can note only that intense reactions (+++ and ++) occur more frequently in children afflicted with the exudative type than the productive (four out of thirty-one, as contrasted to four out of forty-seven). Not one of the five children with the continually relapsing type of disease course showed a positive reaction (Table 1).

Table 1.

General immunological reactivity in children afflicted with rheumatism, depending on the type of disease course.

General immunological reactivity	Type of disease course			
	productive	exudative	continually relapsing	Total number of patients
+++	1	1	-	2
++	3	3	-	6
+	17	11	-,	28
± and -	26	16	5	47
Total	47	31	5	83

Table 2

General immunological reactivity in patients with various cardiac defects.

General immunological reactivity	No. of patients with cardiac defects		
	Myocarditis	Endomyocarditis	Pancarditis
++++	2		
++	4	2	
+	14	13	1
± and -	24	16	4
Total	44	31	5

Contrasted to data obtained with healthy children, those with rheumatism show a significant decrease of general immunological reactivity.

In analyzing general immunological reactivity in patients with various cardiac defects (Table 2), we noted intense reactions (++ and +++) primarily in those patients who had mild cardiac defects (myocarditis, in 6 out of 44 examined patients); at the same time, there were no +++ reactions with endomyocarditis, and a ++ reaction occurred in two out of 31 examined patients.

General immunological reactivity dropped sharply in patients with pancarditis. Thus, in four out of five children, the reaction was negative.

In this way it was possible to draw a parallel between the level of general immunological reactivity and the severity of cardiac defect.

Contrasting the properdin level with the level of general immunological reactivity in relation to the children's clinical record, we noted that the severest course of disease occurred in patients with low immunological reactivity (negative and doubtful reactions) and high properdin level. Of 27 such patients, four had a severe disease course, while in nine others the disease course was of moderate severity. Of 10 patients with low immunological reactivity and moderate properdin level, a severe disease course was observed in one patient; a moderately severe course, in three. Of

fifteen patients with a positive general immunological reactivity and high properdin level, the rheumatic course was severe in only one child; in six, the course was moderate.

The optimal was a combination of a positive test of general immunological reactivity, and a moderate properdin level. Of 11 such patients, only one had a moderately severe course of disease. There were no critically ill in this group.

The results of our observations indicate a direct correlation between general immunological reactivity and the clinical picture. This was evidenced first, by a noticeable decrease in general immunological reactivity in patients as compared to the healthy, and secondly, by an even greater decrease during a severe disease course, as, for example, in patients with the continually relapsing type as contrasted with other types. Undoubtedly, the lowering of general immunological reactivity results from the disease itself, but at the same time at each stage of the disease the level of general immunological reactivity is a factor influencing the development of the next stage. This interconnection between the disease course and the changes in the patients' general immunological reactivity can be traced if its dynamics are observed at different periods, starting with the onset of disease. We do not have sufficient facilities for such observations, and the accumulation of records presents yet another problem.

With the sum of the data, we were able to note an insignificant drop in the average properdin blood level in rheumatism patients as contrasted to healthy children. Moreover, with the productive and exudative type of disease course, the number of cases of lowered properdin level increased toward the end of the second month. If the properdin level is regarded as an index of the organism's general resistance to harmful agents, then one must come to the conclusion that this resistance was lowered in a significant number of patients as a result of the disease which the patient experienced.

Serious consideration must be given to the noted increase in properdin titer during the severe course of the continually relapsing form of disease. In these cases, one can scarcely speak of an increase in the organism's general resistance. One is forced to consider factors which are present during this form of disease course and which can contribute to the unusual increase in properdin titer. It is known from experimental data that when animals get a parenteral introduction of zymozane [?] and analogous polysaccharides of microbal origin, the properdin level, after decreasing initially, increases significantly and quite stably. It can be supposed that during a severe course of rheumatism, analogous factors are at work. Further study should clarify the nature of these factors and should determine whether the noted effect is peculiar only to streptococcal infections. In any case, the obtained results force one to be cautious in evaluating data on the properdin level during

rheumatism (and, possibly, during streptococcal in fections). The observations on the clinical significance of various combinations of both studied indices, described toward the end of this work, deserve a particular amount of attention.

Conclusions

1) The properdin blood level in children afflicted with rheumatism is somewhat elevated at the onset of disease, and then decreases, especially so in the exudative type of disease course.

In children with severe forms of a disease course, high properdin titers are noted at the onset of disease.

2) There is a direct relation between the general immunological reactivity and the clinical picture. This is evidenced first, by the lowering of the rheumatic patient's general immunological reactivity as compared to the healthy, and secondly, by its significant decrease in the critically ill.

3) Varying combinations of the general immunological reactivity level and the properdin titers were noted; these combinations corresponded to the different types of disease.course.

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DIAGNOSTIC SIGNIFICANCE OF CERTAIN IMMUNOLOGICAL INDICES OF RHEUMATISM IN CHILDREN.

-USSR-

[Following is the translation of an article by K. P. Sarylova, O. I. Volokhina, and M. A. Monakhova in Pediatriya (Pediatrics), Vol 40, No 2., Moscow, February 1961, pages 37-42.]

The study of diagnostic problems in rheumatism has lately received a great deal of attention. Each new method which tends to elucidate this disease attracts the lively interest of clinicians.

One such new method is the titer determination of antistreptohyaluronidase and antistreptolysine-O.

There exists at present a significant amount of research work, both here in the Soviet Union and abroad. Although the authors of these works have not discovered any specificity in these rheumatic indices, they, nevertheless, as a rule, reaffirm a certain diagnostic value in them for determining rheumatism (V. N. Anokhin, M. S. Ignatova, R. D. Gataulina, B. P. Shoks, E. V. Kovaleva, T. V. Dratvina, E. Stoeber, F. Kuster, Waeegren, Arviol, and others).

Nevertheless, the problem of dynamic changes in the titer levels of antistreptohyaluronidase and antistreptolysine-O during the active phase of the rheumatic process in children is not clear. The study of this problem is the basic goal of the present work. Obviously, these tests must be compared with the results of the most thorough clinical examination of patients.

We also wanted to find out which of these two reactions has greater diagnostic value, by comparing the data on the titer levels of antistreptohyaluronidase and antistreptolysin e-O.

In all, we observed 45 children between the ages of five and fourteen years. They were at the Facultative children's Clinic II of the Moscow Medical Institute imeni N. I. Pirogov, based at the Children's City Clinical Hospital No 1, Moscow. The antistreptohyaluronidase and antistreptolysine-O research was done in the laboratory of the Faculty Therapeutic Clinic of Treatment, Department II, at the Moscow Medical Institute.

Of the children we observed, 34 had an active phase of rheumatism, and eleven had chronic tonsillitis. In the basic group, 23 children were suffering from rheumatism for the first time, while 12 others had had indications of previous rheumatic attacks.

In 18 children of the total number of patients, a typical rheumatic polycarditis was noted in their clinical picture, while the rest had rheumocarditis either without any apparent affections

of the joints, or with slight arthralgias. Two children were afflicted with pancarditis.

Antistreptohyaluronidase and antistreptolysine-O titers were determined in all patients every 10 to 15 days; in all, each had two, three, and four examinations. MacClean's method was used in the antistreptohyaluronidase determination, while in the antistreptolysine-O determination, Rants and Rendell's method was used, as modified by the Institute of Epidemology and Microbiology im: [Honorary Academician] N. F. Gamaley, Academy of Medical Sciences, USSR. There was concurrent ESR examination [erythrocyte sedimentation rate].

Similar observations were made on eleven tonsillitis patients; in ten of these, the indices of antistreptohyaluronidase and antistreptolysine-O did not exceed the norm established for such titers (antistreptohyaluronidase, 125 to 225 units; antistreptolysine-O, up to 335 units). Only in one tonsillitis patient were these indices increased, and with this, there was a concurrent quickening of the ESR.

Thus, our observations, just as those of other authors, did not establish an increase in antistreptohyaluronidase and antistreptolysine-O titers in children with chronic tonsillitis.

Analysis of the titer size of antistreptohyaluronidase and antistreptolysine-O in children with an active phase of the rheumatic process showed that these titers are almost always increased. In individual cases, they reach very high figures; with antistreptohyaluronidase, they exceed the normal by six to eight and even ten times; with antistreptolysine-O, the figures exceed the norm by three to four times. Consequently, a more detailed study is needed on the correlation between the two immunological indices of the course of the rheumatic process in children.

With this aim in mind, we compared the maximal anti-streptohyaluronidase titers with the maximal antistreptolysine-O titers in the same patients during the entire experimental period. The results showed that the average maximal antistreptohyaluronidase titers were, as a rule, higher than the antistreptolysine-O titers (see Figure 1).

We also made a comparative analysis of maximal antistreptohyaluronidase and antistreptolysine-O titers in two groups of children: those with their first rheumatic illness on the one hand, and on the other, those with repeated rheumatic disease. The average maximal antistreptohyaluronidase figures were 1,668 in patients with their first rheumatic attack, while in patients with repeated attacks, it was 1,577; with antistreptolysine-O, in patients with first attack, 757, and in repeated attacks, 665. The somewhat higher figures of these indices in patients experiencing their first attack was probably explained by the fact that in this group there were more patients with evident exudative symptoms (especially with polyarthritis) than in the patients with recurrent attacks.

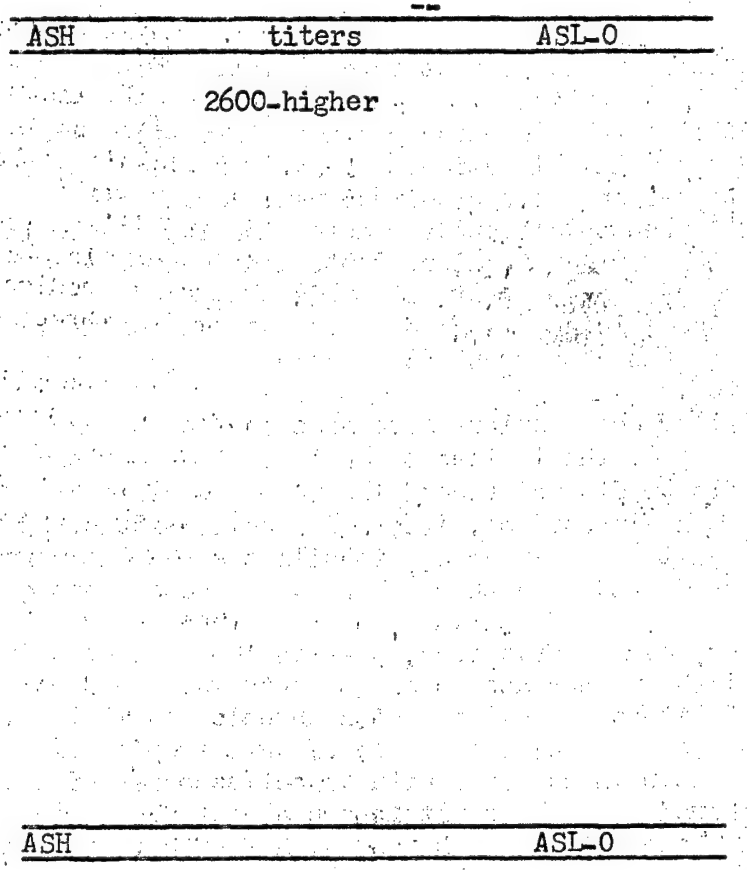

Figure 1. Maximal titer indices of antistreptohyaluronidase antistreptolysine-O in children with an active phase of rheumatism.

Our observations also showed a certain pattern in the fluctuations of the maximal antistreptohyaluronidase (ASH) and antistreptolysine-O (ASL-O) titers, depending on the duration of the active rheumatic process (see Figure 2). During the initial 10 to 12 days after the first obvious clinical symptoms of the rheumatic process, the average maximal ASH titer was 1350, i.e., almost five times the normal. By the twentieth day, this average index remained at the same high level, and was even slightly higher than the previouw one. Three weeks after the onset of disease, it decreased significantly (880), and after that, it continued at the same moderately increased level.

The dynamics of the ASL-O titer were rather different from that of ASH. Depending on the duration of the active rheumatic process, the average ASL-O titer did not have a pattern as characteristic as did the ASH. During the first twenty days after the onset of disease, the ASL-O titer equalled 500; i.e., it exceeded

the norm only twofold. After that, it increased somewhat (730), and then again decreased (600).

These generalized observations of the difference between titer fluctuations of ASH as compared to ASL-O during the course of the rheumatic process can be seen in Figure 2.

The following examples serve as illustrations.

Patient A, 13 years old. Diagnosis: rheumatism, active phase, endocarditis, chronic tonsillitis. Became ill three weeks before entering [clinic]. After the boy had had angina, the physicians began to notice a change in his heart; there was enlargement, tachycardia, and a systolic murmur which gradually increased. Three days before the boy entered the clinic, his temperature had risen to 40°R, remained high for two days, and then became subfebrile. Blood analysis at this time showed a quickening of the ESR to 48 mm/hour.

The boy had developed weakly. At three years of age, he had had whooping cough; at four, chicken pox. During the past two years he had frequently suffered from angina.

At entry into clinic: condition moderately severe, pale, sweaty; temperature was normal. Oral: tonsils enlarged, porous, hyperemic. Heart: boundaries enlarged somewhat in both directions, heart sounds were dull, systolic sound at the apex; this gradually increased in intensity. Pulse, 92/min; arterial pressure, 95/40 mm. The liver protruded two centimeters from under the rib cage. Electrocardiogram: slight diffuse changes of the myocardium. Roentgenoscopy: Heart and lungs were normal. ESR, 45 mm/hr; titer of complement, 0.02; S-reactive protein, 0.2; ASH titer, 2,000; ASL-O titer, 500. Treatment with pyrimidine, after which the condition improved, the temperature remained subfebrile, the ESR decreased to normal (8 mm), the ASH and ASL-O titers remained high. The ASH titer, after a certain decrease (1250), again increased to 2000; following this, there was a recurrent intensification of the rheumatic process.

Figure 2.

	ASH & ASL-O titers	1-10 days	11-20 days	21-30 days	More than 31 days

Figure 2

ESR	ASH & ASL-O titers	Up to 10 days	11-20 days	21-30 days	More than 31 days

Antihyalorudinase (ASH) -- Antistreptolysine-O (ASL-O) -- ESR

Fig. 2. Dynamics of the average antihyalorudinase, antistreptolysine-O, and ESR figures depending on the duration of active rheumatic process in children.

Patient Kh., nine years old. Diagnosis: rheumatism, relapsing endomyocarditis, deficiency of the mitral valve, circulatory deficiency of the first degree, tonsillitis. The child grew and developed normally. At three years of age he had had scarlatina; measles, at one year of age: chicken pox, at two. Has been ill with rheumatism since November 1958, when there occurred an acute attack of polycarditis and rheumocarditis after angina. From that time, the boy was always droopy, often had subnormal temperature, was short of breath after physical stress, and developed heart defect. The present intensification began two days before the child was admitted to the hospita; the temperature had gone up to 38°R, and pain in the joints appeared.

When admitted to the hospital, his condition was serious. Temperature was 38°R, he was pale, with severe loss of appetite. Oral: tonsillitis. Heart: boundaries significantly enlarged in both directions, heart sounds were dull, systolic noise at apex; this latter noise was sustained, blowing, directed toward the left and toward the base. Emphasis of the second sound was on the pulmonary artery. Pulse, 120 beats per minute. Arterial pressure 90/60 mm. Liver protruded from under the rib cage by 4 cm, and was rather dense. Electrocardiogram: an increased sinus rhythm, impaired exci-

tation of the atrium cordis, and a slow-down in the intraatrial conductivity. Roentgenoscopy: heart enlarged in all directions because of enlarged heart cavities. Blood analysis: hemoglobin, 60%; RBC (red blood count), 3,540,000; WBC (white blood count), 9,600; non-segmented neutrophisls, 5%; s. [segmented neatrophils?], 57%; eosinophils, 3%; lymphocytes, 28%; monocytes, 7%, ESR 48mm per hour; ASH titer, 500; ASL-O, 500; complement titer, 0.08; S-reactive protein, 6 ml. Urine normal.

Pyrozolidone and digitalis were used in treatment. After five days a certain improvement was noted, but after two weeks, deterioration. A ring-like rash appeared on the body, the cardiac boundaries again expanded, a diastolic noise was heard, the ASH titer increased to 2,000; ASL-O titer, 625; the ESR was 19 mm/hr. Treatment indicated: prednisone, 20 mg a day (10 mg twice a day); aspirin, 0.3 gms four times a day. Gradually, his condition improved, the cardiac boundaries contracted, the liver grew smaller, the ESR was 8 mm/hr, and the S-reactive protein disappeared. Complement titer was 0.01; ASH titer was moderately increased: 825, and then 525; ASL-O titer, 250.

In this way, our observations of the dynamics of ASH and ASL-O titers in children undergoing an active phase of rheumatism allowed us to draw conclusions about the increase in these titers during this stage of the rheumatic process. The ASH titer especially increased. The size of this index titer was not only greater than that of ASL-O, but in its increases it reacted more rapidly to intensifications of rheumatism.

It was interesting to compare the titer sizes of these two immunological reactions with the size of an index which is very typical of the active rheumatic process, such as the ESR.

Figure 2 shows that the curve of the average ASH titer sizes had the same regular pattern as that of the ESR; i.e., as the active rheumatic process lost intensity, the ASH curve repeated the ROE curve. In comparing the ESR and the ASL-O titer curves, we cannot see a similar pattern.

Our data likewise lead to the conclusion that during the quescent period of the rheumatic process, the ASH and ASL-O titers remain elevated with a normal ESR. As the acute phase of the rheumatic process approaches, the ASH titers increase before either clinical symptoms become apparent, or the ESR increases. The following example illustrates this point.

Patient Z, 12 years old. Diagnosis: rheumatism, first attack, polyarthritis, endomyocarditis. Three days before admission to hospital, the boy had gotten his feet wet. Sharp pains appeared in the legs, the joints had swollen. Grew and developed normally. Had had measles, whooping cough, mumps. Tired quickly in school.

On admittance: condition severe. For three days had abdominal pains, and both pain and swelling of the knees and talocalcaneal joints. Heart- boundaries enlarged in both directions. Systolic

noise in apex, tachycardia, arterial pressure 100/60 mm. Blood analysis: Hb, 57%; RBC, 3,800,000; WBC, 14,000; non-segmented neutrophiles, 5%; segmented neutrophiles, 74%; eosinophiles, 1%; lymphocytes, 12%; monocytes, 8%; ESR, 62 mm/hr. Urine normal. Roentgenoscopy: Heart enlarged toward the left, increased pulsation. ECG: slight changes of a diffuse kind in myocardium. ASH titer, 500; ASL-O titer, 500; complement titer, 0.02; S-reactive protein, 1 ml.

Treatment with pyrimidine and prednisone. Patient's condition gradually improved; temperature became normal, pains in joints disappeared by the fifth day, heart boundaries contracted, ESR decreased to 13 mm/hr. Complement titer increased to 0.05; S-reactive protein disappeared. The boy was allowed to leave the clinic on the 36th day of the disease, but the ASH and ASL-O titers remained elevated (500). The ASH titer had jumped sharply to 1,875 just before the boys' discharge. Three days after discharge, the boy was back with an intensification of the rheumatic process.

It is evident from patient Z's disease that a decrease in the clinical symptoms of rheumatism was accompanied by a return to normal of the ESR. At the same time, the ASH and ASL-O titers remained high. The increase in ASH was especially noteworthy. Then again, a sharp intensification of rheumatism was observed.

In this way, the determination of ASH and ASL-O is especially valuable when the clinical data and the ESR do not indicate an active rheumatic process. This is their [the titers'] great practical significance.

Conclusions

1) During the active phase of the rheumatic process in children, the ASH and ASL-O titers increased. This corresponds to the clinical characteristic of the disease. The increase in ASH and ASL-O titers is noted as early as the first days of the clinical rheumatic symptoms.

2) The elevated ASH and ASL-O titers during the quiescent phase of the rheumatic process are valuable diagnostic indices of those deep-seated immunological changes in the child's organism which cannot be evidenced adequately by the clinical picture of the disease.

3) The parallelism between the dynamics of ASH and ESR is characteristic only of the acute period of the rheumatic process. Subsequently, with the normalizing of the ESR, the ASH titer can remain elevated for a long time after.

4) Although the nature of ASH and ASL-O titers is not specific to rheumatism, their determination can nevertheless be recommended for introduction into medical practice as a supplementary,

objective diagnostic test for ascertaining the activity of the rheumatic process in children, especially in the early stages of its development. However, clinical data and clinical observations continue to be basically important criteria for evaluating the patient's reactions.

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10,225 -END-